

**What Is Claimed Is:**

1. A method for producing an optical element with at least one curved surface by spherical separation from a basic  
5 body with a spherical-cap-like separating body with cutting elements, said separating body being moved through said basic body or said basic body being moved through said separating body, while at the same time a relative rotational movement takes place between said basic body  
10 and said separating body with a rotating axis which passes through the center point (M) of the pivoting movement.
2. The method as claimed in claim 1, wherein said spherical-cap-like separating body rotates during the separating cut.  
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3. The method as claimed in claim 1, wherein said basic body rotates during the separating cut.  
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4. The method as claimed in claim 1, wherein at least two optical blanks for the optical element are removed from said basic body in such a way that a concave side of a first optical element and a convex side of a second optical  
25 element are formed simultaneously by a single separating cut.
5. The method as claimed in claim 4, wherein lenses are produced as optical elements.  
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6. The method as claimed in claim 5, wherein lenses are produced from quartz glass for projection lenses or lighting optics in microlithography.

7. The method as claimed in claim 5 wherein lenses are produced from crystals, such as calcium fluoride, barium chloride, magnesium fluoride or lithium fluoride, for projection lenses or lighting optics in microlithography.

8. A method for producing a lens for projection lenses or lighting optics in microlithography, with at least one curved surface by spherical separation from a basic body with a spherical-cap-like separating body with cutting elements, said separating body being moved through said basic body or said basic body being moved through said separating body, while at the same time a relative rotational movement takes place between said basic body and said separating body with a rotating axis which passes through the center point (M) of the pivoting movement.

9. The method as claimed in claim 8, wherein said spherical-cap-like separating body rotates during the separating cut.

10. The method as claimed in claim 8, wherein said basic body rotates during the separating cut.

11. The method as claimed in claim 8, wherein at least two optical blanks for the optical element are removed from said basic body in such a way that a concave side of a lens and a convex side of a lens are formed simultaneously by a single separating cut.

12. A device for producing an optical element with at least one curved surface from a basic body, with a spherical-cap-like separating body with cutting elements, said separating body or said basic body being pivotable  
5 around a pivoting axis with a curvature about a pivoting point (M) which corresponds to the curvature of the separating cut to be introduced into said basic body, and said basic body being accommodated in at least one receptacle.

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13. The device as claimed in claim 12, wherein said basic body is accommodated rotatably around its longitudinal axis in at least one receptacle.

15 14. The device as claimed in claim 12, wherein said separating body is provided with a drive device, with a rotating axis which passes through the center point (M) of the pivoting movement.

20 15. The device as claimed in claim 12, wherein the optical elements to be produced are lenses, said spherical-cap-like separating body having a part-spherical shell and it being possible to remove from the basic body at least two optical blanks for lenses in such a way that a concave side of a first lens and a convex side of a second  
25 lens can be produced simultaneously by the separating cut.

30 16. The device as claimed in claim 15, wherein said separating body has a part-spherical shell in at least approximately the form of a bell, said cutting elements being arranged on the outer circumference of the part-spherical shell.

17. The device as claimed in claim 15, wherein said separating body has a part-spherical shell, which is provided in the region of the pivoting axis of said separating  
5 body with a bore in which said basic body can be accommodated with its receptacle, and wherein said part-spherical shell is held on its outer circumferential wall on said separating body by means of a holding device, said cutting elements being arranged on the inner  
10 circumference of said part-spherical shell.
18. The device as claimed in claim 17, wherein the holding device for the part-spherical shell has a clamping device, detachably connecting said part-spherical shell to  
15 said separating body.
19. The device as claimed in claim 18, wherein the region of said separating body with which said part-spherical shell is connected via said clamping device is formed at  
20 least approximately as a cylindrical housing.
20. The device as claimed in claim 19, wherein said cylindrical housing is supported by a rotary bearing on a device fixed to the machine.  
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21. The device as claimed in claim 19, wherein said cylindrical housing is provided with damping elements.
22. The device as claimed in claim 17, wherein said part-spherical shell is provided with damping elements.  
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23. The device as claimed in claim 22, wherein one or more damping elements are integrated into said part-spherical shell or connected to it.

5 24. The device as claimed in claim 23, wherein said damping elements are arranged on one or both sides of the part-spherical shell.

10 25. The device as claimed in claim 24, wherein said damping elements are arranged displaceably in the radial direction on said part-spherical shell.

15 26. The device as claimed in claim 25, wherein said damping elements are displaceable individually under open-loop or closed-loop control by sensors which pick up vibrations of said part-spherical shell.

20 27. The device as claimed in claim 12, wherein said basic body is accommodated at both ends in receptacles pneumatically, mechanically, hydraulically or magnetically.

25 28. The device as claimed in claim 27, wherein one of said two receptacles is provided with a rotary drive device and the other receptacle is provided with a follower device.

30 29. The device as claimed in claim 27, wherein said receptacles are displaceable in the direction of the rotating axis, which passes through the center point (M) of the pivoting movement.

30. The device as claimed in claim 12, wherein said basic body is under an axial tensile force in the at least one receptacle in a clamped state during the separating cut.
- 5 31. The device as claimed in claim 12, wherein said separating body with its cutting elements arranged on the circumference of said separating body has a vibration-damping construction.
- 10 32. The device as claimed in claim 12, wherein said separating body is divided into two or more parts.
33. The device as claimed in claim 12, wherein said separating body is provided on at least one of its surfaces with depressions.
- 15 34. The device as claimed in claim 33, wherein said depressions are formed as grooves.
- 20 35. The device as claimed in claim 33, wherein said depressions pass completely through said separating body.
36. The device as claimed in claim 34, wherein said grooves are distributed irregularly over said separating body.
- 25 37 . The device as claimed in claim 34, wherein said grooves are provided for transporting flushing fluid to said cutting elements.
- 30 38. The device as claimed in claim 12, wherein said cutting elements are arranged irregularly on said separating body.

39. The device as claimed in claim 12, wherein said cutting elements are formed in a wedge-shaped manner in cross section, the wider side of the wedge being located on the outside.

40. The device as claimed in claim 12, wherein said separating body is provided with clearances or bores in its circumferential wall.

41. A device for producing lenses for projection optics and lighting optics in microlithography with at least one curved surface from a basic body, with a spherical-cap-like separating body with cutting elements, said separating body or said basic body being pivotable around a pivoting axis with a curvature about a pivoting point (M) which corresponds to the curvature of the separating cut to be introduced into said basic body, and said basic body being accommodated in at least one receptacle.

42. The device as claimed in claim 41, wherein said basic body is accommodated rotatably around its longitudinal axis in at least one receptacle.

43. The device as claimed in claim 41, wherein said separating body is provided with a drive device, with a rotating axis which passes through the center point (M) of the pivoting movement.

44. The device as claimed in claim 41, wherein said spherical-cap-like separating body having a part-spherical shell and it being possible to remove from the basic body at least two optical blanks for lenses in such a

way that a concave side of a first lens and a convex side of a second lens can be produced simultaneously by the separating cut.